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TECHNICAL DIRECTORATE

Archaeology

Specification for Site-Specific Written Schemes of Investigation

Document Number: CRL1-XRL-Z1-RSP-CRG03-50001

Document History:

Revision:	Date:	Prepared by:	Checked by:	Authorised by:	Reason for Issue:
1.0	29 Nov 11	██████████	██████████	██████████	For Implementation

Previous Document History: CR-PN-PRW-EN-PD-00009

Version:	Date:	Drafted by:	Authorised by:	Reason for Revision:
0.1	13 Dec 2007	██████████		First draft version for comment
1.0	18 Jan 2008	██████████	██████████	Revised to integrate with Generic WSI

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1 Purpose

1.1 General

- 1.1.1 This document sets out the detailed scope, standard and template for the production of archaeological site-specific Written Schemes of Investigation.
- 1.1.2 A Generic Written Scheme of Investigation (WSI) (Document Number: CRL1-XRL-T1-XWI-CRG03-50001) has been developed for Crossrail that sets out the project strategy for archaeology design, evaluation, mitigation, analysis, dissemination and archive deposition that will be adopted during the design and construction of Crossrail. The Generic WSI presents a general statement of objectives, standards and structure for the planning and implementation and reporting of archaeological works.
- 1.1.3 It includes an explanation of technical terms and general specification for the principal evaluation and mitigation strategies (including analysis, dissemination and archive deposition) to be employed. It provides a structured model and guidance for ensuring that a consistent approach is applied to the management of archaeology at individual sites across the entire Crossrail route and throughout the life of the project.
- 1.1.4 In accordance with the principles in the Generic WSI, appropriate archaeological mitigation measures will be designed for individual Crossrail worksites (or groups of worksites), and will be set out in detail in a series of site-specific WSIs. This document provides the scope, standard and template for site-specific WSIs to ensure that they conform to a common project standard in terms of content, format and quality of the information.
- 1.1.5 This document forms one of a series of procedures and specifications for archaeology which are being produced to support the implementation of the Generic WSI. Other documents within the series which are particularly relevant to the production of site-specific WSIs are cross-referenced as appropriate within the text. These include:
- Archaeology Specification for Detailed Desk Based Assessment (Document Number: CRL1-XRL-T1-ASM-CRG03-50001)
 - Archaeology Specification for Evaluation & Mitigation (including Watching Brief) (Document Number: CRL1-XRL-T1-RSP-CRG03-50001)
 - Procedure for Non-Listed Built Heritage Recording (Document Number: CRL1-XRL-T1-GPD-CR001-00001)
- 1.1.6 Given the requirement for site-specific WSIs to be periodically updated throughout the design, construction and post-excavation phases of the project, this document will be revised and reissued as necessary to reflect any new relevant procedures and specifications.

2 Scope

2.1 Summary

- 2.1.1 The outcomes of Desk-Based Assessment, Detailed Desk-Based Assessment and any field evaluation undertaken will determine the need for further archaeological site-based assessment and/or mitigation to be undertaken at any particular worksite (or group of worksites). Subsequently, an appropriate package of archaeological mitigation will be designed and set out in detail in a series of site-specific WSIs.
- 2.1.2 Each site-specific WSI will describe the local archaeological conditions, the proposed construction works and interface issues and will specify in detail the mitigation measures required for the site, including the priority, order and timing of the archaeological works within the overall construction programme.
- 2.1.3 Site-specific WSIs will evolve as 'living documents' as the project progresses. Where appropriate, the documents will be updated periodically to reflect detailed changes in engineering design and to incorporate ongoing fieldwork results.

2.2 Objectives

- 2.2.1 Taking account of best practice and nationally accepted guidelines (as set out in the Generic WSI), site-specific WSIs shall be written to meet the following objectives:
- To set out the scope of archaeological work in sufficient detail for it to be quantified, implemented and monitored;
 - To define the specification for the archaeological work, the recording that is required, and the collection and disposal strategy for finds;
 - To reflect the nature of archaeological remains likely to be found and the nature of the development impact, whilst allowing sufficient flexibility for variable site conditions;
 - To comply with the controls set out in the Environmental Minimum Requirements (EMR) for Crossrail, including the requirement on the nominated undertaker to use reasonable endeavours to adopt mitigation measures that will further reduce any adverse environmental impacts caused by Crossrail, insofar as these mitigation measures do not add unreasonable costs to the project or unreasonable delays to the construction programme.



2.3 Technical Scope

- 2.3.1 In accordance with the Generic WSI 'archaeology' is taken to include resources below-ground (including remains of archaeological, palaeo-environmental and quaternary geological importance) and above-ground non-listed built heritage structures. The scope of site-specific WSIs will therefore include archaeological remains of all periods falling within this definition.
- 2.3.2 There are a variety of methods which are widely used for archaeological site-based assessment and/or mitigation and the Generic WSI (Section 6.3) sets out the range of methods which may be appropriate for implementation as part of the Crossrail works. In designing detailed programmes of evaluation and mitigation for the site-specific WSIs, archaeologists should refer to the sequential process of site-assessment, evaluation, mitigation and analysis as set out in the Generic WSI.

2.4 Geographic Scope

- 2.4.1 Site-specific WSIs will address all works being undertaken by Crossrail including enabling works, main construction works and systemwide contracts.
- 2.4.2 Site-specific WSIs will include drawings (prepared in accordance with Crossrail design standards) which show the spatial extent of the Crossrail works, site information that is relevant to the archaeological investigation and any areas to be excluded from the scope of the site-specific WSI.
- 2.4.3 Project Partners shall be expected to adopt a comparable methodology for implementing the Crossrail EMR's and Generic WSI requirements.

2.5 Temporal Scope

- 2.5.1 Site-specific WSIs will cover the whole of the design and construction process and the subsequent post-excavation phase.
- 2.5.2 Site-specific WSIs will set out the timing and order of the works and include details of how each stage of the archaeological programme interacts with other Crossrail activities and the parties undertaking them.
- 2.5.3 Site-specific WSIs will identify where further archaeological design work will be required, for example following results of site evaluations, and will set out the programme for producing revisions to the site-specific WSI and specifying the scope of any detailed mitigation works.

2.6 Roles & responsibilities

- 2.6.1 Site-specific WSIs will be prepared by the relevant Archaeological Design Consultant (ADC) supervised by the Project Archaeologist (PA). In accordance with the Generic WSI, ADC shall be suitably qualified and competent to undertake the design work and will have due regard to the relevant legislation, published standards, best practice guidance and codes of practice relevant to Crossrail.
- 2.6.2 Site-specific WSIs will identify any specialist archaeologists which will be required to advise on issues such as: geo-archaeology, Palaeolithic archaeology and Quaternary

studies, specific finds and environmental topics and other specialist areas, as appropriate and will set out the professional qualifications required.

- 2.6.3 Crossrail will appoint an Archaeological Contractor to provide field investigation, recording and post excavation services at each Crossrail worksite.
- 2.6.4 The SS-WSI shall provide the scope, specification, outline programme and deliverables required to be delivered by the Archaeological Contractor.

3 Outline specification for site-specific WSIs

3.1 Source information for site-specific WSIs

- 3.1.1 The outcomes of all the archaeological work undertaken to date in relation to Crossrail will need to be utilised in designing an appropriate programme of further archaeological site-based assessment and/or mitigation for each particular worksite (or group of worksites).
- 3.1.2 In drafting site-specific WSIs the ADC will consider, as a minimum, the following sources of information:
- The Crossrail Environmental Statement and supporting Specialist Technical Report (i.e. Desk-Based Assessment and any committed mitigation);
 - Any relevant field evaluation carried out to date;
 - The outcomes from any Detailed Desk-Based Assessment (DDBA) which has been undertaken in accordance with the Crossrail Procedure for DDBA i.e. referring to DDBA reports, detailed site plans and (where relevant) site deposit models; and
 - Any relevant Undertakings and Assurances contained within the EMR.
 - The most recent design, programme and construction planning information for all associated contracts



- 3.1.3 Where no DDBA was required, the site-specific WSI will need to briefly summarise the extent of former disturbance to archaeological levels on the site (e.g. from ground reduction, piling, other foundations, basements, utilities etc.) and describe the historical development of the deposit sequence.
- 3.1.4 Site-specific WSI's will make cross-reference to the relevant background/baseline sources of information but should avoid the replication of information as far as possible.

3.2 Template for site-specific WSIs

- 3.2.1 The site-specific WSIs will be produced in accordance with the standard Crossrail technical report template. The documents should avoid the use of ambiguous language and include a summary of key definitions or glossary where appropriate.
- 3.2.2 In accordance with the Institute for Archaeologists (IFA) Standard and Guidance, site-specific WSIs will be prepared to a standard template set out below. The main body of the site-specific WSI will describe the background, scope, specification, programme and deliverables for the works and relevant supporting information will be annexed to the documents. Site-specific WSIs will contain the following information set out in Table 1.

Main Heading No.	Title	Subsection heading/Notes
1	Executive Summary	/One page maximum
2	Project background for worksite (or group of worksites)	
		Site location / including map and description
		Geology and topographic setting
		Archaeological and historical development of the site / include a summary of previous studies (e.g. Crossrail ES, STR and DDBA); description of deposit model for the site (as appropriate) and expected key phases with particular focus on evidence of previous disturbance (density and layout of previous piling, foundations, services and basements etc.)
3	Construction impact summary and outline mitigation design	/identify the likely impacts on the deposit sequence from the enabling and main construction works and describe how impacts will be mitigated (in outline terms)
4	General and specific aims of the fieldwork	/including research design objectives of the investigation and research aims (Annex 1)
5	Scope of the investigation & field methodology	



Main Heading No.	Title	Subsection heading/Notes
		Type of mitigation surveys/investigations required and quantification – describe the type of proposed investigation(s), the sequence of works, any decision making milestones and the quantity of deposits to be investigated or assets surveyed or other action (for non-listed built heritage assets). Drawings and illustrations will be provided at Annex 3
6	Programme for the investigation	– describe the order and sequence of works and provide an outline programme at Annex 5
7	Specification for the investigation	/referring to the standards set out in the Generic WSI and identifying any variations or additional specification required to address the specific site works i.e.
		Generic standards (collection and disposal strategy for artefacts and ecofacts, arrangements for immediate conservation of artefacts, post-fieldwork methodology, report preparation (method), publication and dissemination proposals, copyright, archive deposition)
		Spatial survey setting out and recording requirements
		Use of plant and materials
		Hand excavation and recording (drawn, written, photographic records)
		Required attendances (Annex 7)
8	Description of required deliverables	/the SSWSI should set out the following requirements to be provided by the Archaeology Framework Contractor.
		Archaeological Contractors Method Statement (including specific strategies for finds, environmental and human remains procedures. Post excavation and information management)
		Archaeological Contractors Health and Safety Plan, risk assessment and safe method of working
		Programme, Programme Risk Assessment, Cost Plan & Resource Plan
		Survey Report, Interim Statement, Summary Report, OASIS Summary Sheet, Fieldwork report
		Digital Datasets & Site Archive



Main Heading No.	Title	Subsection heading/Notes
		Site condition Photographs, Progress Photographs and Reports
		Publication and Dissemination requirements
9	Results of consultation and site monitoring	/set out what consultation has been undertaken on the SSWSI and what the agreed monitoring requirements by consultees during fieldwork are
10	Personnel requirements	/for each SSWSI set out the specific staff roles , required qualifications and resource profile
11	References and glossary of terms	
Annexes		
1	Archaeological Research Agenda	/summarise the relevant extracts from the Generic WSI
2	Site information	/provide any relevant information on Services and Utilities, Extinguishments of Rights of Way, Surface Water Control, Protective Fencing, Credit Boards, Care in Executing the Site Operations, Parking of Vehicles etc that the designer has identified from the specific sites to be investigated
3	Plans and other illustrations	/include as appropriate
4	Health and Safety requirements:	/ADC should provide the following here:
		Designers Risk Assessment and CDM requirements
		Designers drawing showing any residual hazards
5	Environmental protection requirements	/ADC to set out any specific arrangements that the Archaeology contractor should be aware of
6	Programme and order of work	/ADC to provide a programme showing implementation of the works and integration with other activities and contracts
7	Enabling and temporary works design requirements, attendances and implementation	/ADC should identify what the requirements are for temporary works, attendance and implementation required by other enabling works or main contractors
8	Security requirements	/ADC to identify any specific requirements related to security of archaeological finds for the Archaeology Contractor or other enabling works or main contractors



Main Heading No.	Title	Subsection heading/Notes
9	Need for screening or other protective works	/ADC to identify and specific requirements to screen or protect archaeological remains that may be exposed
10	Procedure for notification of the Discovery of Human Remains	/ADC to refer to relevant section of Archaeology Generic WSI
11	Procedure for notification of the Discovery material falling under the Treasure Act 1996	/ADC to refer to relevant section of Archaeology Generic WSI
12	Procedure for notification of major unexpected discoveries	/ADC to refer to relevant section of Archaeology Generic WSI

Table 1 – Template structure for Site Specific WSI's

- 3.2.3 Site-specific WSIs will include any requirements for further detailed method statements to be produced by the contractor.

4 Approach to the design of mitigation

4.1 Design standards

- 4.1.1 Archaeological evaluation and mitigation programmes will be designed based upon the analysis of the information referred to in Section 3.1.2 and in accordance with the mitigation strategy and research agenda set out in the Generic WSI. Relevant standards and guidance referred to in the Generic WSI such that published by the Institute for Archaeologists, English Heritage and relevant local authorities shall also be taken into account.
- 4.1.2 Evaluation and mitigation design will take care to identify public and private utilities, groundwater levels, geotechnical ground conditions, current and former landuses, the impact of archaeological excavation on infrastructure or nearby structures and buildings, buried obstructions or surface constraints that may affect the design rationale or implementation of the works.
- 4.1.3 Wherever feasible construction design measures will be set out that seek to minimise impacts on archaeological remains located in temporary working areas and areas required for access or temporary storage of plant or materials. This may be achieved through use of protective measures such as fill blankets, other temporary protective materials, or use of particular types of construction plant.
- 4.1.4 Where appropriate, site-specific WSIs will identify risks associated with undertaking archaeological works in the vicinity of historic buildings, structures and features (where they are not specifically within the scope of the WSI) and will set out appropriate working methods to prevent or control impacts upon them.

4.2 Health and safety requirements

- 4.2.1 The design for archaeological site evaluation works and mitigation will take full account of the designer's duties under the Construction (Design and Management) Regulations 2007 (CDM). Designs should seek to minimise exposure to all hazards through avoidance and incorporating suitable hazard mitigation measures where required. Site-specific WSIs will include a designer's risk assessment to record how hazards have been minimised and highlight any residual hazards likely to occur during the works.
- 4.2.2 Site-specific WSIs will include a requirement that the archaeological contractor prepare method statements, site-specific risk assessments and a health and safety plan to be reviewed and approved by Crossrail prior to implementation.
- 4.2.3 Site-specific WSIs will highlight that all works involving access to live railway property will require archaeological staff without exception to be carrying Network Rail Personal Track Safety (PTS) certification and that supervision staff or external parties monitoring archaeological works will not have access to live railway property, unless in permitted circumstances, as escorted visitors.

4.3 Programming of archaeological works

- 4.3.1 Each site-specific WSI shall include a proposed programme of archaeological work referenced against key events in the Crossrail design and construction programme.
- 4.3.2 To achieve this, the Crossrail programmes for Enabling works (EW) (involving buildings demolitions, site remediation, utility and services diversion and protection works, works to public highways, Network Rail and London Underground infrastructure) and main works (to construct Crossrail permanent way, stations and ancillary infrastructure) will need to be reviewed and requirements for archaeological works identified and integrated with activities to be carried out by other Contractors in liaison with the Archaeology Contractor.
- 4.3.3 The programme should identify and allow for the necessary site access procedures to be completed in advance of works commencing on site.
- 4.3.4 In designing the programmes of archaeological works the archaeologist will need to consider how the proposed evaluation and mitigation programme can be best delivered to minimise risks to the overall project programme whilst achieving the archaeological investigation objectives.
- 4.3.5 The programme for site-specific evaluation and mitigation will be presented in the following phasing:
- CRITICAL phase: advanced archaeological works which need to be undertaken prior to the EW (this may apply to very significant archaeological remains where complex mitigation is required and where early site access is required)
 - Phase 1 archaeological works: to be undertaken commensurate with the programme of Enabling Works Contracts
 - Phase 2 archaeological works: to be undertaken commensurate with the main construction works Contracts
 - Phase 3 archaeological works: to be undertaken after the main construction phase (i.e. any post fieldwork monitoring, post excavation assessment, analysis, publication and dissemination).

4.4 Consultation and monitoring

- 4.4.1 Site-specific WSI's will summarise the results of any consultation with relevant authorities which has been undertaken (in accordance with the requirements set out in Section 8 of the Generic WSI).
- 4.4.2 Site-specific WSIs will identify the monitoring arrangements for the work and individual consultees relevant to the location or type of investigation being undertaken in accordance with the Crossrail Archaeology Consultation Procedure (Document Number: CRL1-XRL-T1-GPD-CRG03-50001).

4.5 Post-excavation works

- 4.5.1 Completion of fieldwork will result in an archive of significant finds and environmental assemblages and project records (written, drawn and photographic/digital plans). Site-specific WSIs will specify the requirement for a formal post-excavation project phase in accordance with the Generic WSI.

4.6 Reporting

- 4.6.1 In accordance with the Generic WSI, site-specific WSIs will provide details of the reporting outputs required. Specific outputs are likely to include interim reports, Historic Environment Record (HER) summary reports, final fieldwork reports, post-excavation assessment reports, and analysis and publication outputs. Further guidance on the format and content of such outputs may form the basis of future procedures and specifications produced by Crossrail.

4.7 Unexpected major discoveries

- 4.7.1 Site-specific WSIs will make reference to the project procedure for dealing with unexpected major discoveries and human remains as set out in the Archaeology Generic WSI.